

TERRA

THE NATURAL HISTORY MUSEUM OF LOS ANGELES COUNTY

VOL. 24, NO. 6 • JULY/AUGUST 1986



MEMBERS' TRAVEL PROGRAM



See greater kudus in Swaziland.

Grand Canyon River Rafting September 7–13, 1986

The Wilderness Studies Institute will lead us on this exciting trip on the Colorado River. Floating through the timeless Grand Canyon is an experience you'll never forget. This trip has been very popular with our members for four years now, and we will once again be led by Dr. John Wright, our curator of herpetology. Dr. Wright will lecture on the geology, archaeology, and wildlife of the awesome Grand Canyon. \$550 including trainfare.

Alaskan Odyssey: America's Glacial Wilderness September 5–20, 1986

We have reserved the "M.V. Majestic Explorer" to sail the dramatic and diverse fjords of Southeast Alaska. From the ship and on shore excursions, we will see huge glaciers, countless waterfalls, snow-capped mountains, and dense forests—not

to mention wildlife including brown bear, mountain goats, puffin, sea otter, humpback and killer whales and more. We take time out to visit historic gold-rush-era towns. Our trip begins in Vancouver with a visit to the World's Fair. From \$3,380 plus airfare.

Swaziland: Animals & Archaeology September 24–October 9, 1986

Don't miss this unique trip! During our stay in this tiny African nation, we will be lodging at the Swaziland Archaeological Research Association's Research Center within the famous Milwane Wildlife sanctuary. In addition to viewing a vast array of African game, we will explore Lion Cavern, the oldest mine in the world, and a Middle Stone Age quarry site more than 80,000 years old. We'll see cave paintings, volcanoes, remote tribal villages, and more: \$2,099 plus airfare.

Length & Breadth of the USSR October 6–24, 1986

On this all-encompassing tour of the U.S.S.R. we will, of course, see the sights of Moscow including the Kremlin, the world-famous onion-domed Cathedral of St. Basil the Blessed built by Ivan the Terrible in 1560, and more. But from there, our journey takes an unusual twist as we go to Khabarovsk, a fascinating corner of Asia, where we'll see Kamchatka's active volcanoes and a unique biological island with subtropical life. Then we'll board the Trans Siberian Express bound for Irkutsk, the metropolis of Central Siberia founded in 1652 by rebellious Cossacks. A full day excursion to Lake Baikal is a biologist's delight, and then we're off to Tashkent, capital of the Uzbek Republic. We end this incredibly vast tour with four days in Leningrad, including a visit to the Winter Palace, now housing the great Hermitage Museum. \$2,195 plus airfare.

Steamboatin' on the Mississippi November 28–December 7, 1986

Mark Twain once said, "If cotton is king and surely he is, then the steamboat is queen." Join us on one of the great, truly American adventures: Steamboatin' on the Mississippi. Romance, nostalgia and history abound on this cruise through the heartland of America. Our voyage begins in fabled New Orleans, stopping at historic Vicksburg, beautiful Natchez, and modern Baton Rouge, among others. Experience true Southern charm and a quieter, more genteel way of life on our paddlewheeler, the "Mississippi Queen." From \$1,511 including airfare.

Amazon Exploration November 30–December 8, 1986

Beginning in colonial and modern Lima, we will fly to Iquitos, the "city in the jungle" and onto Tabatinga, where we will board the "M.V. Rio Amazonas," our floating hotel. The

Amazon's sheer immensity, unrivaled diversity of fauna and flora, and its beauty and tranquility make it the ultimate paradise for nature lovers. Experience the adventure of the lush rain forests, Indian tribes, and more. \$2,395 including airfare.

Sands of the Sahara December 26, 1986–January 3, 1987

Possibly our most exciting expedition of the year: a rendezvous with the Blue Men of the Hoggar at the yearly trade festival in Tamanrasset. These mysterious people of Berber descent roam the Sahara endlessly and are called "masters of the desert." From Tamanrasset, we will journey into the Hoggar Mountains, a volcanic range where we will find archaeological remains, neolithic engravings and awe-inspiring rock formations. You will never forget the extra-terrestrial landscape of the Saharas. \$1,315 plus airfare.

Guatemala: Heartland of the Ancient Maya January 8–24, 1987

The Classic site of Copan will be only one of the highlights of this trip to the land of the Maya. We'll visit Tikal, one of the oldest and largest Maya cities, and other sites as well. The mountains, rivers, volcanoes and valleys of Guatemala and the lush jungle wildlife and exotic birds will round out this beautiful tour. Last year's study tour through the Mayan sites of the Yucatan sold out very quickly, so don't wait too long to call about this one. \$1,965 plus airfare.

For further information, please send a self-addressed stamped envelope with your request to: Natural History Museum of Los Angeles County, Membership Office, 900 Exposition Blvd., Los Angeles, CA 90007, or call Museum Membership at (213) 744-3426.

TERRA

THE MEMBERS' MAGAZINE
OF THE NATURAL HISTORY MUSEUM
OF LOS ANGELES COUNTY
AND THE PAGE MUSEUM
OF LA BREA DISCOVERIES

VOL. 24, NO. 6 · JULY/AUGUST 1986



COVER: King Henry VIII's *Mary Rose*, from a contemporary document in Magdalene College, Cambridge. Photograph courtesy of the Mary Rose Trust.

EDITOR

Robin A. Simpson

ASSOCIATE EDITORS

Harry J. Pack/Kathy Talley-Jones

DESIGN

Armin Krumbach

EDITORIAL BOARD

Craig C. Black/Greg P. Byrd/
Daniel M. Cohen/Kenneth J. Daponte/
Joan Grasty/John M. Harris/Peter C. Keller/
Harry Kelsey/William A. Mingst/Harry J. Pack/
Robin A. Simpson

ADVERTISING SALES REPRESENTATIVES

Heide Thorstenson/Francis Strazzulla
50 West Hillcrest Drive, Suite 215
Thousand Oaks, CA 91360
Telephone: 805/496-3500
Telex: 182640 WKVG

TERRA is published bimonthly by the Natural History Museum of Los Angeles County and is sent as a benefit to museum members. Single copy price: \$2.50. Subscriptions: \$12 per year. For membership information, visit the Membership Office at the Natural History Museum or call 213/744-3426. All other inquiries can be referred to the Publications Office, Natural History Museum, 900 Exposition Boulevard, Los Angeles, CA 90007, or call 213/744-3330.

Printed by North Hollywood Printing Co., Inc.

Color separations by Computer Color Corp.

Typography by RSTypographics

All Rights Reserved. Reproduction in whole or in part without permission is prohibited.

ISSN 0040-3733

CONTENTS

Museum on the Move 4



"The Noblest Ship of Sail and a Great Ship":
The Fall and Rise of the *Mary Rose* 6

by Margaret Rule



The Chinese Dinosaurs 15

by John M. Harris



The Mountain Gorilla:
Anatomy of a Rescue 18

by Kelly J. Stewart
and A. H. Harcourt



Cep Cuisine and the Fearful Philistine 24

by William Breen

Curators & Collections 28

MUSEUM ON THE MOVE

CHALLENGE GRANT MADE TO GREAT BIRD HALL. The Harry and Grace Steele Foundation has challenged the Natural History Museum to raise \$500,000, which the foundation must match, to fabricate and install the Wetlands Marsh Habitat in the museum's proposed Great Bird Hall. The hall, which is currently being designed (see *Terra*, May/June 1986), is one of three new permanent exhibits to be funded by the museum's \$30 million Seventy-Fifth Anniversary Campaign. Under the terms of the Challenge Grant, the museum must raise \$500,000 in cash or real property no later than December 31, 1987.

The Wetlands Marsh Habitat will be one of three major walk-through environments within the Great Bird Hall. Visitors to this realistic reconstruction of a breeding ground for ducks and geese will come away with a new understanding of the importance of birds in our world as well as an appreciation of nature and the urgent need to maintain the limited open space available for these creatures. The Great Bird Hall's wetland marsh, California condor, and tropical rain forest habitats will be complemented by approximately twenty interactive displays presenting facts about and principles of ornithology.

For more information on the Great Bird Hall and how you can participate in the Steele Foundation Challenge, please contact the Museum Foundation Office at 213/744-3307.

NEW DISCOVERY CENTER PLANNED.

The Ralph M. Parsons Discovery Center, a long-time dream of the museum's Education Division and Docents, is on its way to becoming a permanent part of the museum in early 1987. Thanks to a major grant from The Ralph M. Parsons Foundation, the museum is moving forward to refurbish and equip a 9,000-square-foot space off the Rotunda that will house a multisensory exhibit of natural science and historical objects. Here visitors, especially children, will be able to touch, smell, manipulate, classify, and enjoy artifacts that were previously only visible behind glass.

The Ralph M. Parsons Discovery Center will be an integral part of the museum's unique approach to education, which currently includes the School Tour Program, the Moveable Museum School (and hospital) Outreach Program, and the Lending Service. It will provide a one-of-a-kind learning experience for all



Four members of the Discovery Center committee meet to look over plans and discuss ideas. Left to right, Mrs. Jack Young and Mrs. Thomas Reddin (Alliance Board of Directors), Joan Grasty (Chief of Education), and seated, Peggy Kayser (Education Division). Photograph by Dick Meier.

visitors: preschool and elementary school age children with a Docent as the educational leader, families with parents as guides, handicapped persons who will have an opportunity to experience the museum more fully, and average visitors wanting more of an opportunity for exploration and discovery than a museum normally affords.

According to Joan Grasty, Chief of Education, the most striking feature of the Discovery Center will be several major exhibit areas modeled after the museum's mammal habitat halls, with one very important difference: visitors will be able to walk into, touch, and explore the settings. The exhibits will include a North American forest habitat in which visitors will encounter a giant tree teeming with life: insects, birds in their nests, small mammals in their burrows, and other vertebrate and invertebrate forest inhabitants. A walk-in quarry complete with rocks, gem pockets, and fossils will give visitors an introduction to geology,

mineralogy, and paleontology.

Various learning centers are also planned. Is It Real will feature the arts of taxidermy, casting, and modelmaking; Body Coverings will demonstrate the differences between fur, feathers, scales, and quills; and Paws, Jaws, and Claws will explain concepts of animal defense, movement, and hunting. Visitors will learn the basic differences between mammals, birds, reptiles, amphibians, fishes, insects, and other invertebrates.

Other features of the Discovery Center include:

- Discovery Boxes, which will contain information on a multitude of natural science, archaeological, anthropological, and historical themes. Laminated information cards in English, Spanish, and Braille will encourage users to explore the specimens included in each box.
- Learning stations designed to teach a single significant concept such as ar-

chaeology or evolution.

- Many large touch specimens that cannot fit into regular museum exhibits will also be included in the Discovery Center.

On the mezzanine a series of exhibits will introduce natural history concepts and give a behind-the-scenes look at the museum itself. From this vantage point, visitors will be at eye level with a seventy-foot-long finback whale skeleton suspended from the ceiling. The whale will provide a theme for special events for children called Whale's Tales that will be held on weekends. These events will consist of storytelling, puppet shows, and live animals for visitors to observe and touch. Two new classrooms with movable partitions will also be available for specialized learning.

A planning committee, chaired by Associate Director for Public Programs Dr. Peter Keller, is working with exhibit designers and fabricators. Members of the committee include museum staff members Joan Grasty, Peggy Kayser (Education Division), Jim Olson (Exhibits), Docents Jean Low and June Weiss, and Alliance Board Directors Mrs. Warren L. Driver, Mrs. Kenneth Leventhal, Mrs. Roy Nutt, Mrs. Thomas Reddin, Mrs. Charles E. Ryker, and Mrs. Jack Young.

NEW REGIONAL COUNCIL PROGRAM. The Alliance Board of Directors has established a regional councils program to increase public awareness of the Natural History Museum and add to its membership. There are currently two councils. The Westside Council serves Beverly Hills, Brentwood, Pacific Palisades, Santa Monica, West Los Angeles, and Westwood. The Foothills Council is active in the Pasadena and South Pasadena area, and includes Arcadia, La Canada Flintridge, and San Marino. Both groups have developed similar programs, with committees presenting lecture series, curatorial talks to clubs and organizations, museum representation at community events, and telephone follow-up to lapsed museum members.

Additional councils will be established in other parts of greater Los Angeles in the coming months. If you would like to serve as a member of either the Westside or Foothills Council, or help organize a council in the area in which you reside, please call Michael Bell, Assistant Director for Development, at 213/744-3438.



NEW STAFF MEMBER: MARK A. RODRIGUEZ. Mark A. Rodriguez has joined the Natural History Museum as Deputy Director, Administration. In this position he will be responsible for operations and administration in finance, personnel, security, general services, facility maintenance, and serve as staff support to the museum's Seventy-Fifth Anniversary Campaign.

Mr. Rodriguez attended UCLA, where he majored in Political Science. He has attended the Los Angeles County Marshal and Sheriff academies. He also served for a time as a Deputy Marshal. Prior to beginning work at the museum, Mr. Rodriguez was Senior Assistant Director of the Los Angeles County Facilities management Department, where he was responsible for the Planning and Operations Branch, which encompassed county-wide security, parking, long-range planning, support management, and data processing functions. In addition, Mr. Rodriguez has also served as Deputy Director for the Los Angeles County Department of Consumer Affairs, Assessor, and Parks and Recreation, and as Chief of Staff for Los Angeles County Supervisor Michael D. Antonovich.

Mr. Rodriguez's extracurricular activities include serving as Los Angeles County's Alternate Member to the Santa Monica Mountains Conservatory Board, membership in the International Footprinters Association, Los Angeles County's Hispanic Managers Association, International Assessing Officers Association, Lexington Lodge 104 F&AM, American Youth Soccer Association, and the State of California Personnel Review Boards.

BOARD OF TRUSTEES OF THE NATURAL HISTORY MUSEUM FOUNDATION

Robert S. Attiyeh
President
Leslie C. Curtis, Jr.
Vice President
Mrs. Justin Dart*
Vice President
William A. Mingst
Vice President
Charles O. Parker II
Vice President
Richard C. Seaver*
Treasurer
Dr. M. Norvel Young*
Secretary
Richard Call*
Assistant Secretary
Alex W. Hart
Assistant Treasurer
Ed N. Harrison*
President, Board of Governors
Robert V. Adams
Mrs. Jane Boeckmann*
F. Otis Booth, Jr.*
Judge William Matthew Byrne, Jr.
George V. Caldwell
Otis Chandler
H. Frederick Christie
David Comsky*
Mrs. Arthur L. Crowe
A. Frederick Gerstell
Frederic E. Giersch, Jr.*
Albert B. Glickman
Mrs. Stephen E. Griffith
John F. Harrigan
David W. Hearst
Mrs. Robert R. Hollman*
Ivan J. Houston*
Mrs. Robert G. Irvin*
Linda Dyer Knight
Dan L. McGurk
G. Everett Miller
Robert P. Miller, Jr.
Stephen R. Onderdonk
George C. Page
Susan F. Rice
Richard J. Riordan
Nelson C. Rising
Marc A. Seidner*
Mynatt Smith*
Mrs. James Stewart
Mrs. Franz Talley
C. B. Thornton, Jr.
Richard S. Volpert*
Mrs. Hal Wallis
John G. Wigmore*
Gin D. Wong
James R. Young

*Governor

ALLIANCE BOARD OF DIRECTORS

Robert S. Attiyeh
William J. Bird
Neal H. Brockmeyer
Mrs. Francis L. Dale
Mrs. C. Warren Driver
J. Shelton Ellis, Jr.
Mrs. Robert Feinerman
Dr. Herbert Friedmann
Gregg Gann
Mrs. Robert Gelber
Judge Ronald M. George
Mrs. Allan M. Herbert
Mrs. David Jacobs
Sherwood Kahlenberg
Mrs. Eugene Kramer
Carole Sumner Krechman
Mrs. Kenneth Leventhal
Ernest M. Lever
Marvin H. Lewis
Mrs. Hugh Logan
Alan G. Lowy
Douglas J. Macdonald
Mrs. Maurice Machris
Ray McCullough
John L. Meek
William A. Mingst
Mrs. Roy Nutt
A. F. Osterloh III
Suzanne Peck
Mrs. Dan Pocapalia
Mrs. Thomas Reddin
Mrs. Charles Rinsch
Mrs. Charles E. Ryker
Cy Schneider
Mrs. Leon I. Singer
Mrs. Irving Stone
Harry H. Tytle
Mrs. Dwight Vedder
Frank J. Vodhanel
James R. Young
Mrs. Jack Young



THE NOBLEST SHIP OF SAIL AND A GREAT SHIP

THE FALL AND RISE OF THE *MARY ROSE*

by MARGARET RULE



Margaret Rule



Mary Rose Trust

Left: The scene on October 11, 1982, when the remains of the *Mary Rose*, supported in a steel cradle, were recovered from 40 feet of water. Above: The crane used by archaeologists to replace timbers removed from the ship while underwater is dwarfed by the remains of the hull, which stands as high as a four-story building.

Henry VIII, by Grace of God, King of England and France and Lord of Ireland, ascended to the throne as a mature, well-educated man of eighteen in 1509. In that same year shipwrights began to build the great ship *Mary Rose*, named by the king after his thirteen-year-old sister, in a dry dock in Portsmouth on the south coast of England.

Sea defense and the ability to control the passage of the channel between England and France were of vital importance, and in order to maintain supremacy of these waters, Henry VIII embarked on a program of naval development, commissioning new ships, commandeering foreign vessels on the high seas and in English ports, and, when necessary, purchasing foreign vessels. He had inherited a meager fleet of four ships from his father, Henry VII, but when he died, he left ninety ships to his son, Edward VI. But the *Mary Rose* was not among them. For on 19 July 1545, when the ship was fully manned and going out to meet a French invasion fleet, she suddenly and inexplicably heeled onto her beam ends and sank. Her captain, Richard Grenville, and the Vice Admiral of the English fleet, Sir George Carew, both went down with their ship.

The discovery of the site of the wreck in the late 1960s and the total excavation that followed enabled archaeologists to survey and record the association of men with their weapons, shipboard equipment, and personal possessions in a way never undertaken before. Altogether more than 3,000 timbers and over 16,000 registered finds were recovered from the site before the spectacular recovery of the surviving half hull in October 1982. The objects represent the tangible remains of a seafaring community of soldiers and mariners who fought, lived, and finally died together on 19 July 1545.

The *Mary Rose* is one of the earliest purpose-built English warships, designed to carry heavy guns on permanent gun decks from her first launching in 1510. She was modified and strengthened to take even heavier guns in 1536.

As a fighting platform she could be so maneuvered as to bring her guns to bear on the enemy with speed and accuracy, and this feature changed the face of naval warfare in the sixteenth century. Her armament was carried on four decks, and bronze muzzle-loading guns protruded through gun ports alongside wrought-iron breech-loading guns. The disposition of these guns, and the use of the lighter wrought-iron swivel guns in the castles at the bow and stern, suggest a rational approach to battle with antiship guns loaded with iron shot, capable of damaging the superstructure and the rig-

ging of the enemy ship side by side with guns loaded with either stone shot or cannisters of sharp flint flakes. These were effective against men manning and defending the enemy ships.

One eye-witness account of the sinking says that nearly 700 men drowned when the *Mary Rose* sank. As the ship's normal complement was 415 men, this extra burden of men, armor, and hand weapons may have contributed to the disaster. Before this date the ship had a good record as a successful sailing ship, and Sir Edward Howard, who sailed on board her as admiral in 1513, described her to the king as "the noblest ship of sail and a great ship." What went wrong on that calm sunny day in 1545 is still unclear, but now that the survey of the hull is nearing completion and the ship's lines can be defined, it is possible to

study the ship's theoretical stability exactly as we would study the stability of a modern prototype design. The weight and disposition of ballast, guns, men, and heavy equipment are known, and theoretically it will be possible to test the model to destruction. Was the placement of a culverin (a long cannon) weighing 1.2 tons on the upper deck in the sterncastle a significant error? The mortice for the stirrup of a small swivel gun cut into the sill of this gunport suggests that at some stage of her history the *Mary Rose* had carried only light armament at this height above the waterline.

Whatever the reason—the ship sank. Water poured in through her open gun ports and neither the small scupper holes situated above the main decks nor the ship's pumps could deal with the sudden ingress of water on the starboard side.

(Continued on page 10)



N. Rule

Page 8: Archaeologists Margaret Rule and Alex Hildred examining a box of yew longbows that had been recovered intact from a storage area on the *Mary Rose's* orlop deck.

Below: Navigation equipment recovered from the *Mary Rose*, including a plotting table, pocket sundial, dividers, and broken slate protractor.





Henry VIII as he grants a charter to the barber surgeons of London, an engraving after a painting by Hans Holbein. One of the richest finds aboard the *Mary Rose* was a beautifully preserved barber surgeon's chest, which contained drug flasks, razors, syringes, and the wooden handle of a saw used for amputation. Barber surgeons practiced surgery, medicine, and dentistry as well as barbering.

(Continued from page 8)

Men were knocked off their feet as boxes, buckets, and other loose equipment slid across the decks, and even those who made it to the upper decks were trapped beneath the coarse diamond-meshed antiboarding netting placed there for their protection.

The remains of some two hundred individuals found on the site have been studied. They fall into four age ranges, with most of the individuals being in their late teens/early twenties and another group in their late twenties/early thirties. There is a much smaller number of young boys and of men in their forties. The average height of the mature adults was five feet, seven and one-half inches, and it seems clear that we are dealing with the well-preserved skeletal remains of a selected group of healthy young men. Nonetheless, evidence of childhood dietary deficiency is present and quite common.

Several skeletal abnormalities may be attributed to occupational stress factors. Skeletons associated with archery equip-

ment had deformation of two vertebrae of the lower back, indicating stress involved in twisting the spine. More important, however, are anomalies of some shoulder joints. In this case parts of the shoulder blade that are normally fused in adults remain unfused, producing an unstable joint. This is an unusual condition that normally has a low frequency of 2 percent in a normal population. However, with the *Mary Rose* men the frequency is 13.5 percent, occurring predominantly on the left shoulder where we would expect stress from the use of heavy bows. Both these abnormalities are consistent with persistent or habitual use of the longbow.

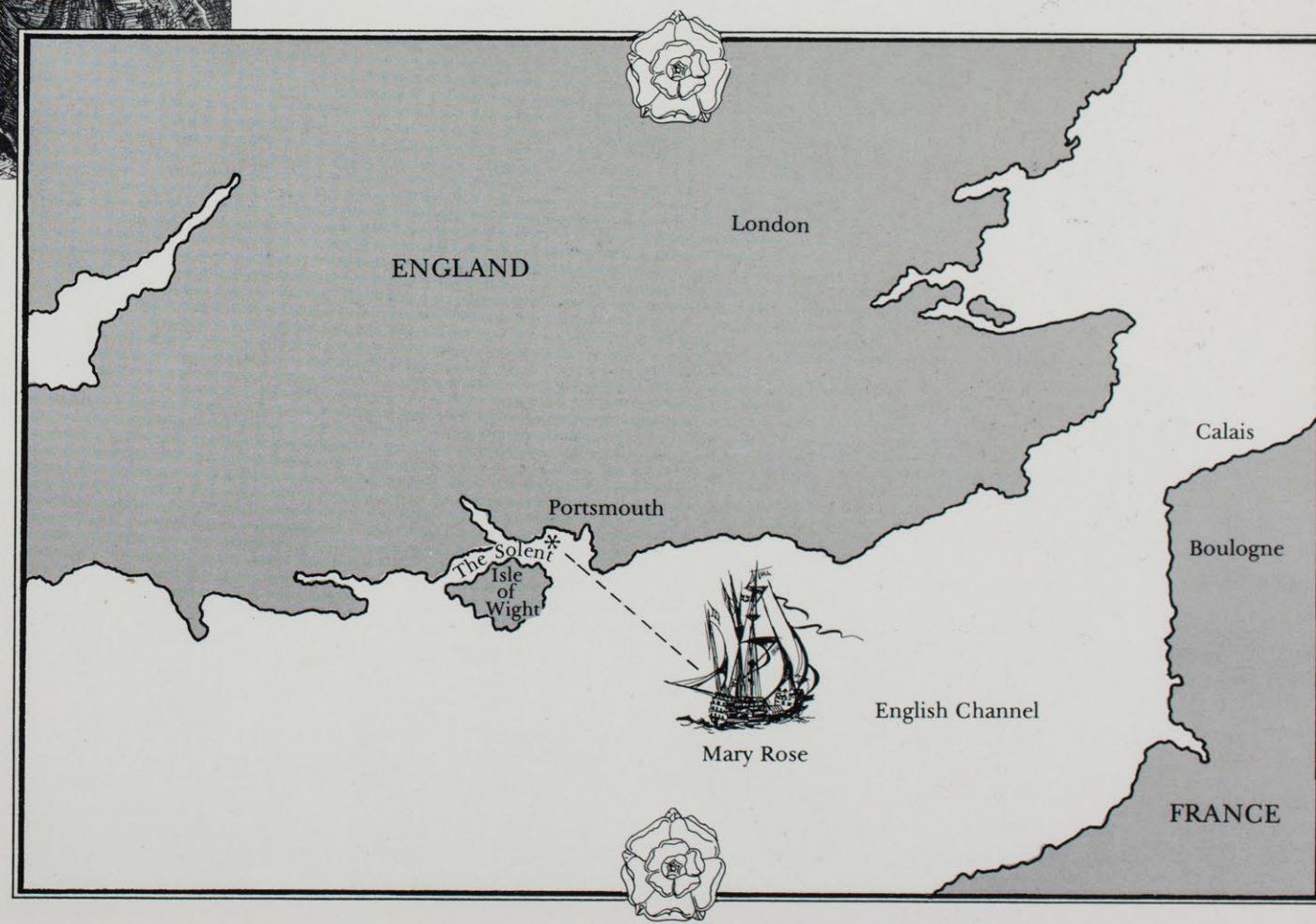
It is worthy of note that Henry VIII ensured the availability of trained bowmen to augment the militia, which were recruited on a county basis from the land-holding yeomanry of England. In 1541 an Act of Parliament confirmed an earlier act of 1512 that ensured that "every man being the King's subject, not lame, decrepid or maimed nor having any other legal cause or impediment and being within the age of sixty years" was

to exercise regularly with the longbow, and every father was to provide his male children between the ages of seven and seventeen with bows and arrows. Such regular exercise with a bow from the age of seven could well cause the deformation seen in the shoulder blades and spines of the archers on board the *Mary Rose*.

The bows are the work of craftsmen who understood the basic material they were working with and the weapon they were making. Fashioned from single billets of fine-grained yew (*Taxus baccata*), the bowyer cleft the wood so that each stave contained a natural section of sap and heartwood. The bows were shaped to a D-section with a relatively soft sapwood on the back of the bow and a thicker section of stiff heartwood on the belly.

A natural laminate of sapwood under tension and heartwood working under compression provided an efficient energy store when strung and drawn. A modern bow made of similar material would be expected to have a range of 220 to 270 yards with an arrow thirty inches long,

(Continued on page 14)



Caryl Maloot

Bronze muzzle-loading culverin cast in 1535 and recovered from the upper deck in the sterncastle of the *Mary Rose*. The gun weighs 1.2 tons, and it was found on its elm carriage run forward through the unlidded gun port.



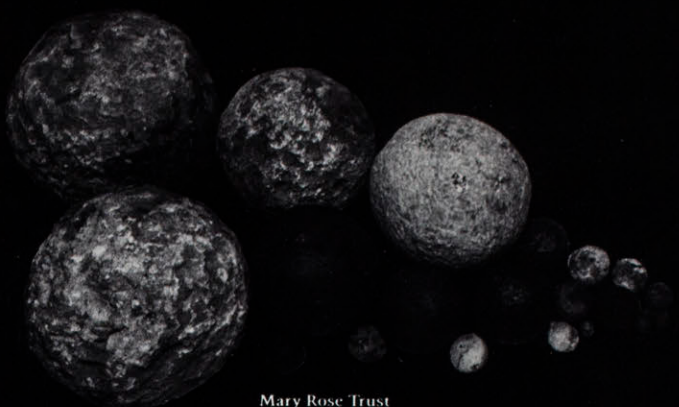
Mary Rose Trust

A selection of leather shoes and a wooden drinking vessel typical of the domestic items found on board the ship.



Mary Rose Trust

A selection of stone, iron, and lead shot found on the *Mary Rose*, including some lead shot with iron cores.



Mary Rose Trust

Elements of running rigging, including blocks, barrels, a bronze sheave, thimbles, and deadeyes. These were found in the bosun's stores on the orlop deck (the lowest deck on the ship).



which is the length of some of the arrows found in the store chests on the *Mary Rose*.

Wooden chests containing stores and the personal possessions of the crew were carefully excavated underwater or recovered intact for excavation either on the deck of the diving vessel or in the laboratory ashore. From these chests a wealth of unique material has been recovered and conserved. The most remarkable are the three steering compasses with their wooden bowls supported on bronze gimbals within a wooden box and carefully balanced with roughly cut lead weights. Taken together with the pocket sundials, dividers, slate protractor, and plotting table, they throw a new light on the type of equipment available to the early navigators when they set out on their voyages of exploration and colonization.

Workaday and fashionable clothing found included leather boots and shoes, knitted hose, and sturdy knitted hats; these provide endless material for the costume historian, and a study of sizes and of wear and tear through usage helps to put flesh onto the bones of the seamen and soldiers.

Samples of the primary sediments within the ship and inside containers are yielding evidence of the fauna and flora of everyday life on board the *Mary Rose*. Broom pods and twigs (*Sarothamnus scoparius*; synonym *Cystisus scoparius*) may have been used to fumigate the vessel, and the pupae of flies indicate the infestation one might expect to find in the food storage areas. A study of meat bones found in casks indicates that the meat was selected and butchered to meet standard specifications. This would have ensured that supplies to the King's ships, which were paid for from the Royal

purse, were actually delivered and also that standard rations could be distributed to each man. The inclusion of marrow bones was judiciously avoided, presumably because they would start to decay in the cask. Eighteenth-century instructions show that selection of meat cuts to be stored in cask was of prime importance: "The beef provided for His Majesty's ships is to be cut into four-pound pieces, and the pork into two-pound pieces; and no unusual pieces are to be put up such as leg bones, shins of oxen, cheeks of hogs, ox hearts..." Similarly, cod (*Gadus morrhua*) of standard size were found in barrels in the hold at the stern of the ship.

In 1565, twenty years after the *Mary Rose* sank, naval victuallers contracted to supply each sailor with the following rations per week:

7 pounds biscuits
7 gallons beer
8 pounds salt beef
 $\frac{3}{4}$ pound stock fish
 $\frac{3}{8}$ pound butter
 $\frac{3}{4}$ pound cheese

Pork, either fresh or smoked, was also used on the *Mary Rose*.

Today the hull is preserved and displayed in the *Mary Rose* Ship Hall specially created in a nineteenth-century dry dock within the naval base in Portsmouth. Since her recovery, almost three-quarters of a million people have visited the Ship Hall to view the hull, and a program of work is now underway to put back into place the decks, cabins, and bulkheads, which were surveyed and removed under water.

The ship is carvel-built (that is, it is built with the planks meeting flush at the seams rather than overlapping) of oak with an elm keel and some minor inter-

nal structures of pine and poplar. The wood is well preserved, and a team of scientists and archaeologists monitor the physical, chemical, and biological integrity of the timbers. To maintain these timbers in a passive state, the ship is sprayed with chilled fresh water, and the atmosphere within the Ship Hall is maintained at 95 percent relative humidity and a cool 8 degrees Celsius. Once the internal structural timbers have been put back into place, a program of work will begin to replace the water in the cells of the wood with polyethylene glycol, and trials are well under way to determine the most effective way of stabilizing and conserving the timbers. An exhibition of objects and full-scale models of sections of the hull is open to the public close to the Ship Hall.

Over two hundred of the finest objects form a nucleus of a traveling display sponsored in the United States by the Armand Hammer Foundation. The pilot's steering compass, the officer's pocket sundial, and the barber surgeon's silk velvet hat are rare items, but the carpenter's tools and the rigging blocks and deadeyes (round wooden blocks used in rigging) must have been common on ships in the sixteenth century. Only thirty-two years after the *Mary Rose* sank, Drake's seamen would have used similar tools and his pilot may have had an identical compass as they sailed to the Pacific and the coast of California. Drake's seamen were recruited from the small seafaring communities of southwest England, and it is quite possible that these men had memories of fathers and uncles who had served the Queen's father on his great ship *Mary Rose*.

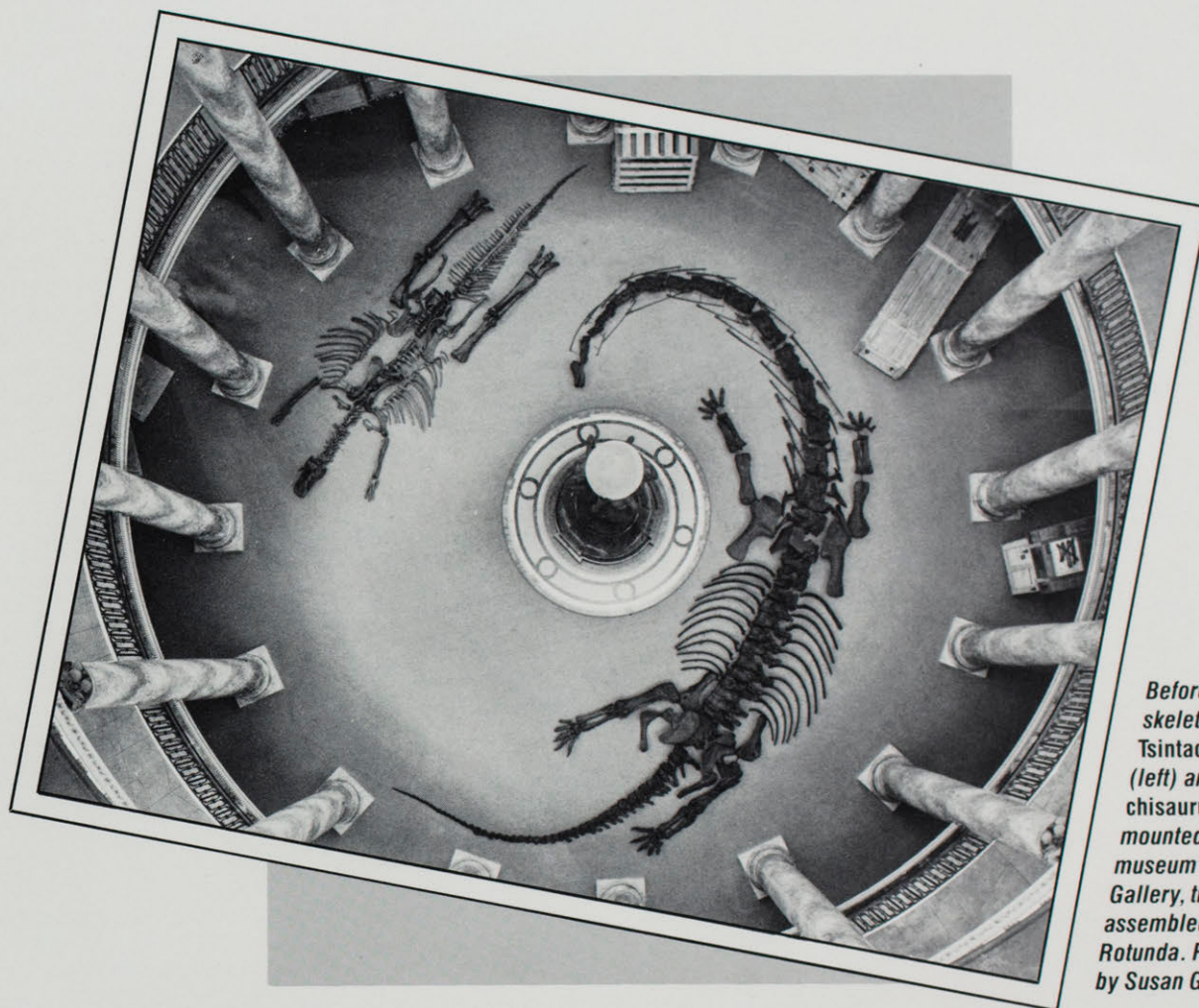
Margaret Rule is the Archaeological Director of the *Mary Rose* Trust.



The partially intact hull of Henry VIII's lost warship *Mary Rose* was raised out of the murky waters off Portsmouth, England, on October 11, 1982. The recovery capped seventeen years of intensive effort to salvage the tangible remains of a seafaring community that perished in the tragic and mysterious sinking of the *Mary Rose* on July 19, 1545. Exactly 441 years later (July 19, 1986) an exhibition of the treasure trove of Tudor artifacts recovered with the *Mary Rose* (the hull itself cannot leave the controlled environment of the *Mary Rose* Ship Hall in Portsmouth) will open in the Natural History Museum of Los Angeles County's Governors Gallery. The exhibition is made possible by the Armand Hammer Foundation and Occidental Petroleum Corporation in cooperation with the *Mary Rose* Trust, England. It runs through October 15, 1986.



THE CHINESE DINOSAURS



Before the skeletons of the *Tsintaosaurus* (left) and *Mamenchisaurus* were mounted in the museum's Olympics Gallery, they were assembled in the Rotunda. Photograph by Susan Gipson.

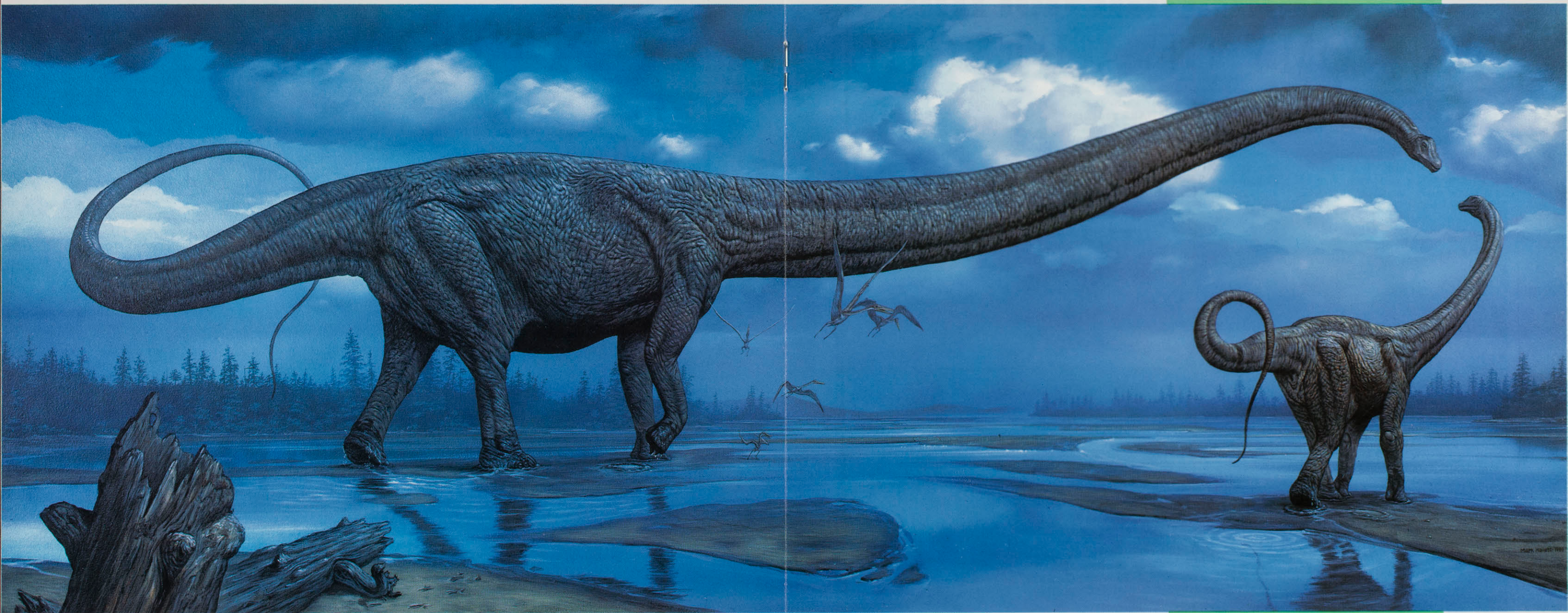
Casts of two spectacular dinosaur skeletons from China have been purchased by the Natural History Museum and are currently on display as part of the Dinosaurs Past and Present exhibition. These casts, the first to be seen in North America, were produced by the Museum of Victoria in Melbourne, Australia, by arrangement with the Institute of Vertebrate Paleontology in Beijing, Peoples' Republic of China. Both will remain on exhibit until the end of 1987 and will thereafter feature prominently in the paleontology galleries that will

occupy the museum's new north wing complex.

The fossilized skeleton of *Mamenchisaurus hochuanensis* was discovered by a team of scientists exploring for oil near Kuanmushan in Hochuan County of Sichuan Province in western China. The site was one where "dragon bones," the bones and teeth of extinct animals that the Chinese grind and use for medication, had been collected for many years. Although the nearly complete skeleton was excavated in 1957 by the staff of the Sichuan Provincial Museum, it was not described and named until

1972. The creature was named *Mamenchisaurus* after Mamenchi, the locality at which it was found, and *hochuanensis* after Hochuan County.

Mamenchisaurus was a giant herbivore (plant eater) that lived in eastern Asia during the Late Jurassic Period (140 to 155 million years ago). It belongs to the family of dinosaurs known as sauropods, of which the best-known representative is *Apatosaurus* (formerly known as *Brontosaurus*). Although *Mamenchisaurus* had only a moderate-size body, it is one of the longest land animals known to science by virtue of its long neck and tail. It



was seventy-two feet long and its neck stretched for thirty feet. Our skeleton has nineteen neck vertebrae, more than any other known dinosaur, and these bear long bony spines. Some scientists have interpreted the anatomy of these vertebrae as suggesting that the creature's neck was held more rigidly horizontal than the necks of other sauropods.

This cast evoked considerable comment from the scientists that had gathered to attend the symposium that opened the Dinosaurs Past and Present exhibition. Topics informally discussed

included the accuracy of the way in which the skeleton had been mounted, if the neck and tail vertebrae belonged to one single individual, whether or not the neck spines, many of which appear to have been broken during the excavation process, were fused with the neck vertebrae or articulated with them, and how flexible the neck could have been. Unfortunately many of these questions could not be resolved without closer examination of the individual components of the original skeleton.

The other new specimen on display is

Tsintaosaurus spinorhinus, a duck-billed dinosaur from Laiyang County in Shandong Province, an area southeast of Beijing. Like other members of the hadrosaur family of dinosaurs, *Tsintaosaurus* walked upright on its hind legs and had a skull in which the bone surrounding the nostrils had been greatly modified. In our specimen this apparent modification takes the form of a peculiar upwardly extending spine—hence the name *Tsintaosaurus spinorhinus* (reptile from Tsintao with a spine on its nose). The purpose of the spines and crests

found on hadrosaur skulls has been debated at length; they may have provided a means of recognizing members of the same species from a distance or may have had something to do with the way these animals made sounds.

Tsintaosaurus stood sixteen feet tall and roamed eastern Asia toward the end of the Cretaceous Period (65 to 80 million years ago). Its jaws contained batteries of small teeth, which were arranged in parallel and adapted for the processing of abrasive vegetation such as cycad fronds.

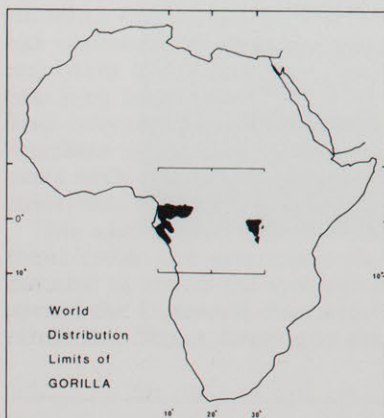
John M. Harris
Chief Curator, Earth Sciences

An adult and a juvenile Mamenchisaurus tread the mudflats of western China some 140 to 155 million years ago. Painting © Mark Hallett, 1986. All rights reserved.

The Mountain Gorilla

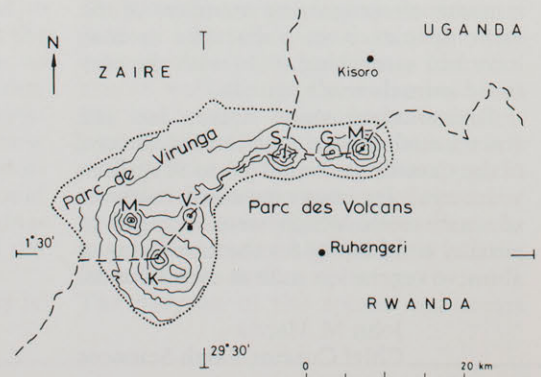
ANATOMY OF A RESCUE

by KELLY J. STEWART and
A. H. HARCOURT



***D**istribution of the species Gorilla gorilla in Africa. Black areas indicate general regions where gorillas are found.*

***T**he Virunga Volcano conservation area straddling the borders of Rwanda, Uganda, and Zaire. Single letters refer to names of the six main peaks. Contour lines area at 300-meter (990-foot) intervals, peaking at 4,500 meters (14,850 feet) on K.*



Through the Rift Valley of eastern Africa runs a chain of eight volcanoes. Two of them are still active, but the other six have long been dormant and are covered in dense, moist montane forest. The tallest of the peaks, rising to over 14,000 feet, is often capped with snow. These mountains—the Virunga Volcanoes—are spectacular in their scenery, but they are best known as the last major refuge of the mountain gorilla.

These are not the only gorillas in Africa. They are one of three races or subspecies into which the species *Gorilla gorilla* is divided. The other two races are the western lowland gorilla—which is found in West Africa and is the sort one usually sees in zoos—and the eastern lowland race from Zaire. Mountain gorillas live in colder, higher habitats than do the other two races and are specially adapted to these conditions. They are certainly the rarest of the gorillas and now occur in only two places: the tiny Impenetrable Forest of Uganda, which harbors only about 115 animals, and the Virunga Volcanoes, where 250 to 260 gorillas live.

Although this second region is considered their stronghold, it is a conservation area of only 375 square kilometers (150 square miles). Known as the Virunga National Park, it is divided among three countries, Rwanda, Uganda, and Zaire, the borders of which run right through the mountain chain. The remaining population of gorillas is an alarmingly small one—especially given their slow rate of reproduction. In the wild, a male is unlikely to breed until he is around fifteen years old—the age of full physical maturity. A female usually produces her first infant at ten years and will then give birth to one offspring every three and a half to four years. All things considered, the survival of the mountain gorilla is seriously in question.

In the late 1970s an internationally funded conservation project was launched in Rwanda in an attempt to secure the future of at least that country's section of the Virunga Volcanoes and its gorillas. This project, known by all as the MGP (Mountain Gorilla Project) has been a success. A seemingly hopeless situation was turned around, and it is worth telling the story.

Following George Schaller's pioneering work on gorilla behavior in the early 1960s, the late American zoologist Dian Fossey established the Karisoke Research Center in Rwanda in 1967 (see *Terra*, September/October 1983). In the eighteen years since then, several gorilla groups have been studied almost continuously by various researchers, and a large fund of scientific data has been

amassed. The information on gorilla ecology (for example, their diet and ranging patterns), demography, reproduction, and social behavior has proved invaluable to conservation efforts.

When we first began our field studies at the research center in 1972, it was well known that the gorillas were in trouble. A census of the entire Virunga population showed that numbers had dropped from about 500 in the early 1960s to nearly half that a decade later. It is likely that a combination of factors caused this decline, because threats to the gorillas were many.

Hundreds of cattle roamed illegally in the park, trampling and destroying the habitat. In addition, there was illegal hunting by poachers, who set rope and wire snares in the forest. Although their main quarry were antelopes, gorillas—especially infants—sometimes stepped into the wire nooses. Workers from the research center identified several animals with maimed or missing limbs, almost certainly the result of trap injuries. And these were just the gorillas that survived the traps; we have no way of knowing how many snared animals died from infection. Fortunately, there was very little direct hunting of the mountain gorillas. Unlike their cousins in West Africa, they were not killed for food or because they raided crops, and at the time there was little trade in gorilla trophies.

Perhaps the most serious long-term threat to the gorillas and their habitat was the taking of land for agriculture. Rwanda could hardly be blamed. It is one of the poorest and most densely populated countries in Africa, and agriculture is the basis of the economy; 95 percent of the people are cultivators, many of them subsistence farmers. In this 26,000 kilometer-square (10,000 square miles) country, there are six million people, and the population is growing at a rate greater than 2 percent per year. Because of the very rich, very fertile volcanic soil in the area, human densities are at their highest around the Virunga National Park, at over 400 people per square kilometer. There was evidence of small-scale incursions into the park, a constant nibbling away at the edge. Far more serious was large-scale official appropriation. In 1968, for example, 40 percent of the park was taken over for the growing of pyrethrum, used as an insecticide. This cash crop scheme was supported by commercial interests abroad. It reduced Rwanda's gorilla habitat to just 120 square kilometers.

The Rwandan government's attitude toward conservation was very encouraging, however. Despite the economic and population pressures, national parks constitute 10 percent of the country, a proportion higher than for any other

A silverback (on left) with one of his breeding females, her infant, and an older juvenile. Males acquire their distinct saddle of white hair at around fifteen years of age and, at 350 pounds, are nearly twice the size of adult females. Sixty percent of mountain gorilla groups contain only one silverback but usually have two or three breeding females. In the Virunga Volcano area there are twenty-eight gorilla groups containing, on average, nine individuals. The silverback is the family's protector and leader. If he is killed by poachers, the whole group is disrupted for long after; females may join other males and infants may be killed in the chaos. Photograph by A. H. Harcourt.

(Continued on page 22)

Wire from a poacher's snare cuts into the flesh of a young gorilla's foot. This infant had to be anaesthetized so that the wire could be removed; if not, she would either have lost her toes or, more probably, died from infection. Since the start of the Mountain Gorilla Project, fifteen gorillas have been rescued from snares. Photograph by A. H. Harcourt.



Agricultural land or shambas surrounding Rwanda's Parc National des Volcans. The rich volcanic soil makes this the most fertile land in Rwanda, known as the "country of a thousand hills." Even the steepest slopes are cultivated right up to the park boundary. The natural forest of the park provides a vital water supply for this region and probably prevents erosion of the cultivated hills. Photograph by K. J. Stewart.



Dr. Stewart with Puck, an adult female. For both research and tourism, some gorillas have been habituated to humans so that they tolerate our close presence without being affected by it. Of course, the human must behave in the correct, deferent manner. The time it takes to habituate gorilla groups depends greatly on the character of the leading silverback. His calmness or nervousness rubs off on all group members. Photograph by D. E. Harcourt.





A three-month-old infant in its mother's arms. This infant will not be able to feed itself or travel independently until it is almost two years old and will not be fully weaned until it is about three. Even after this, its bond with its mother will remain strong for many years. The capture of infants for sale abroad is still a threat to gorillas. Photograph by A. H. Harcourt.

The crater lake at around 3,640 meters (12,000 feet) on the top of Mount Visoke. Mount Mikeno, one of the older volcanoes, rises in the background. Photograph by A. H. Harcourt.



A female infant about two and a half years old. At this age, she still rides on her mother's back during travel periods. If her mother were to die, this infant would turn to the dominant silverback for comfort, following him closely during the day and sleeping nestled next to him at night. The dominant male, who is usually the father of all infants in his group, is the major caretaker of orphans. Photograph by A. H. Harcourt.

(Continued from page 19)

country in Africa and, indeed, most countries in the world. A further 5 percent of Rwanda is forest reserve. In 1975, the Rwandan government took a major step toward improved protection of the Virunga Park by removing all cattle. This was a key action toward rescue of the area, but it was not enough. Small-scale poaching and agricultural incursions continued into the late 1970s, when we became aware of a new and direct danger to the gorillas. The trophy trade had come to Rwanda.

Gorillas, especially adult males, were being killed by groups of poachers with spears and dogs. Their heads and sometimes their hands were chopped off and sold to tourists and foreign residents as souvenirs. One very respected French doctor in Rwanda had bought seven skulls. (He said he didn't know gorillas were endangered.) Trappers were also capturing infant gorillas and selling them to unscrupulous foreign zoos; because of the extremely protective nature of the leading male of a gorilla group, who will actively defend his females and their offspring, it is usually necessary to kill the adult male and the mother to obtain the infant.

Rwanda simply did not have the resources to protect the gorillas and their habitat. Clearly, help from elsewhere was needed. The spark that lit the fire was struck at the end of 1977 when one of the gorillas from the main research group—a nearly fully adult male named Digit who had been observed since infancy—was killed and decapitated by poachers. The British conservation organization, the Fauna and Flora Preservation Society (FfPS) was contacted, publicity was generated, and an appeal was launched. This was the start of the Mountain Gorilla Project.

The project became an international consortium of four conservation bodies, including the African Wildlife Foundation, the Peoples' Trust for Endangered Species (an organization based in England), the World Wildlife Fund, and the FfPS. The coordination and cooperation of so many different groups on the same project is considered in conservation circles something of a feat. Part of the program's success can be attributed to the concentration of funds and energies by the groups on different vital programs: park protection, tourism, and conservation awareness.

Park Protection. In the Virunga Volcanoes, foot patrols in the steep, wet, cold habitat are the only way to control poacher activity and other incursions, and the park guards were completely unequipped and ill-trained to cope with such work. The MGP provided equipment and an advisor experienced in park management. Rwanda's Office of Na-

tional Parks responded by increasing the number of park guards, improving training and selection procedures, and setting up a more effective system of patrolling the park. During the past five years, the MGP has continued to support and supply the security system.

Tourism. For a conservation area to survive the demands of a mushrooming human population, it helps enormously if it can pay its way. Tourism was the only obvious means by which the Virunga Park could make any money and

yards of the animals to see anything. Thus, the gorillas had to become accustomed to groups of strangers approaching them very closely. The MGP recruited field biologists who used techniques developed at the research center to habituate, over five years, four different gorilla groups. Rwandan park guides were trained in the special skills involved, and a central booking system for gorilla visits was organized. The MGP tourism program has been a success because it has remained tightly controlled.

A silverback hooting during the chest-beating sequence, a highly ritualized threat display normally performed by adult males during encounters with other groups or lone silverbacks. Such displays are designed to intimidate other males and to impress and attract females. In a full-blown display sequence, a long series of hoots usually precedes and culminates in the chest-beat. This in turn may be followed by a run, ground-thumping, and foliage whacking. Sometimes this competition goes beyond ritual and breaks into fierce fights between males. Photograph by A. H. Harcourt.



still remain a natural habitat. In 1978, however, tourism was at such a low level and so negligently organized that revenues did not cover costs, and the park lost money.

The key to the MGP's development of tourism was the habituation of several gorilla groups to visitors. Gorilla viewing is not a matter of getting into a Land Rover and driving up to the animals. The gorillas must be tracked and approached on foot, and since the vegetation is so thick, visitors must be within a few

For example, a gorilla group may be visited only once a day by a maximum of six people. These restrictions not only avoid disturbing the gorillas but also maintain the quality of the visit for each tourist.

Conservation Awareness. Revenue from tourism was not the only reason to protect the park and its gorillas. There were ecological reasons as well. Government authorities, land owners, and trophy buyers had to be made aware of the gorillas, the park, and the issues in-

volved. They needed to understand that there was a strong ecological argument to be made for keeping the area as natural habitat for the benefit of farmers living in the surrounding lands. Although the park covers less than 0.5 percent of Rwanda's land surface, it provides 10 percent of the country's water catchment area. It acts as a giant sponge, absorbing and holding water in the wet season and releasing it slowly to the farmers downstream in the dry season. If the park's vegetation were destroyed to make way for agriculture or cattle grazing, the local farmers would lose their water supply and would soon be suffering the effects of soil erosion.

The MGP's conservation awareness program reached all levels of the population by way of posters, calendars, newspaper articles, and radio broadcasts, which publicized the ecological importance of the park and informed the public about the endangered status of the gorillas. Wildlife Clubs were established, and visits to the park were arranged for school children and teachers. A vehicle specially equipped for audiovisual presentations traveled the environs of the park showing films and slide shows to schools and villages. These always had to be outdoor presentations at night because there were no buildings large enough to accommodate the hundreds of people who arrived whenever a film was shown. Perhaps most encouraging of all, Rwanda's Ministry of Education, with help from the Belgian government and the U.S. Peace Corps as well as the MGP, took up the conservation cause and established a conservation program in the secondary school curriculum.

The costs of these three programs to the MGP consortium alone has been around \$50,000 per year.

A census was conducted by the Research Center in 1981, six years after the removal of cattle from the park and two and a half years into the MGP. The survey showed that the Rwandan gorilla population had not only stabilized but had significantly increased its recruitment—that is, the number of young born. This is a good measure of the health of a population. In 1981, there were a greater number of infants (animals ranging from the newborn to those three years old) and juveniles (animals from three to six years old) per adult female than there had been in the early 1970s. Furthermore, Rwanda's section of the Virunga area had significantly more young per adult female than did Zaire's Virunga park, which had not improved its conservation policies. In other words, conservation in Rwanda has had a significant beneficial effect on the gorilla population.

The tourist program has been the most tangibly successful part of the MGP. Rather than being a financial drain on the Office of National Parks, the park earns revenue that more than covers running costs. Between 1978, a year before the MGP program began, and 1983, park revenues increased an incredible 1,660 percent. This was due both to an increase in the number of visitors, from 1,352 to 4,784 per year, and an increase in the fee charged for gorilla visits. It now costs a foreigner \$45 for one visit to the gorillas. It costs a Rwanda citizen only one-tenth this much. The price for a tourist may seem quite steep, but to put it in perspective, a three-course meal with wine at one of the Rwandan tourist hotels would easily cost that much. People may complain about the food, but no one ever complains about a gorilla visit.

Rwanda is the only place in the world where one can see gorillas at such close quarters in their natural environment. Few experiences in nature can touch this. Gorillas draw tourists to Rwanda, and these people then visit the other beautiful places the country has to offer. Tourism is the third largest earner of foreign currency in Rwanda, and gorillas have become the heart of this industry. Rwandans cannot afford to lose their gorillas.

An indirect benefit of the tourist program has been a much greater degree of protection to a greater number of gorillas. Four groups are now visited each day, which serves the function of a patrol. There are twelve gorilla groups that range in Rwanda's Virunga Park, and between the Research Center and the MGP tourist program, seven of these are monitored daily. This not only helps to keep poachers away, but it also means that if a gorilla steps in a wire snare, there is a good chance that it will be found and released.

It is difficult to separate the effects of the tourism program and the conservation awareness program on public attitudes. Both have brought to Rwanda's notice the internationally perceived importance of the mountain gorilla and its habitat. Both have made obvious the immediate benefits to be gained from the park.

On a rather subjective level it can be said that a certain pride in the gorillas has developed in the country, detectable in, for example, a greater readiness to prosecute serious infringements of the country's wildlife laws. Furthermore, there has been a detectable change in attitudes toward the park among farmers living in the areas adjacent to it. In a survey conducted by W. A. Weber, 51 percent of the people in 1980 thought that the park should be converted to agriculture, whereas in 1984 only 18 per-

cent thought so. Similarly, 49 percent of farmers questioned in 1980 felt that the forest was important to their water supply, while in 1984, 86 percent of the people thought it was important.

The MGP has been successful because it has combined three different approaches to the mountain gorilla problem. Many conservationists advocate only policing activities, such as patrolling for and apprehending poachers. Although such protection is certainly necessary, it is not enough. To concentrate solely on antipoacher work is extremely short-sighted. No conservation area can survive unless the people of the country want it to survive and can afford it. A channeling of all funds and energies into army-style patrolling operations will merely exaggerate conflict between the park and the people who have to live around it. Far better that they come to appreciate it and want its survival instead of having it forced on them. The MGP is a success not mainly because the guards have been armed and trained but because the attitudes of the people are changing, and because the park, through the tourism program, is allowing those attitudes to be implemented.

It is certainly not the case that 100 percent of the country support the park's existence and want the gorillas to survive. Nor is it true that the park is free from poachers and a safe haven for the wildlife. However, with continued support for conservation efforts in Rwanda, we can attempt to approach these goals.

Dr. Kelly J. Stewart and Dr. A. H. Harcourt have both studied mountain gorillas at the Karisoke Research Center in Rwanda. Dr. Stewart is currently associated with the Sub-department of Animal Behaviour of Cambridge University and is analyzing and writing up her work on gorillas. Dr. Harcourt is a Fellow of Clare Hall College of Cambridge, where he continues his research and writing on gorillas.

The American zoologist Dian Fossey, who established and ran the Karisoke Research Center, was murdered in December of last year. Her death will not affect the Mountain Gorilla Project, since this program was totally separate from the Karisoke Research Center. Nevertheless, the two work in close coordination. Rwandan authorities, workers with the MGP, and research scientists are all concerned that Karisoke continue to operate as a research station and a base from which park guards may carry out patrols. Since Dr. Fossey's death, these activities have continued, and it is hoped they will do so for many years.

CEP CUISINE AND THE FEARFUL PHILISTINE

by WILLIAM BREEN

The author-artist's fantasy impression of Kate Sargent, American pioneer of mycophagy in the late Victorian era. Kate is a lady of style and is seen here in a moment of triumph as Henri, her milliner, capitulates entirely to her offer of a series of wild mushroom dinners as payment for his creations—the latest of which is an utterly divine Chapeau de Cèpe for little evenings of dalliance at home.

I usher

*Such an unexpected dainty bit for breakfast
As never yet I cook'd: 'tis not botargo,
Fried frogs, potatoes marrow'd, carvear,
carps, tongues, the pith of an English shin
of beef.*

Nor our Italian, delicate wild mushrooms.

Massinger: *Curiosities of Fashion*



What a frightening breakfast! Botargo is a relish made from the roe of mullet or tunny, but the name gives me an uneasy feeling that it is somehow linked to botulism. And "fried frogs" sound as if they came straight out of the blackest pages of *Macbeth*. As for "Italian, delicate mushrooms," there are at least three that come to mind: *Lepiota brunneoincarnata*, *L. subincarnata*, and *L. helveola*. They are all poisonous, and the last one is termed "perhaps deadly." There is of course the possibility that Massinger is actually referring to a choice edible wild mushroom that is certainly anything but delicate. This mushroom is the superb *Boletus edulis*—in English the cep, in French the *cèpe*, and in Italian the fabled and fabulous *porcini*!

And so we come to the third of the Big Three (the other two are chanterelles and morels, featured in the January/

February and March/April 1986 issues of *Terra*). The Italians, by the way, claim that their cep is the best because it frequently grows under chestnut trees and somehow acquires a fresher, nuttier flavor. Since *porcini* means "little pigs," I wonder if there are chestnut-stuffed piglets running around in Italian woods? *Porcini* with *porcini*? No wonder I am already thinking about *duxelles* (that is, using mushrooms as a stuffing).

If you have followed me this far, you know that fresh chanterelles are readily available part of the year, that their apricot-mushroom flavor is addictive, and that our California chanterelles exude a good deal of liquid. All this makes them very attractive. When sautéed Provençale, the disgorged liquid can be used in other dishes, and the sautéing continued until the butter and mushroom essence caramelize. You can carry on with any mushroom cookery idea this method suggests.

You also know that fresh or dried, morels are wonderful. Dried morels are always available, and, very occasionally, fresh morels can be found. They are woodsy and robust in flavor and can be prepared singly or in combination with other things. It is almost impossible to mask their flavor—although too heavy a hand will do it.

When you slice a fresh cep you will note that they smell like hazel nuts, fragrant woodland, earth, an exquisite herb dressing, and a fine musty wine—all magically distilled into one aroma. But before I continue to sing the virtues of fresh ceps, I must reiterate that none of the Big Three is available fresh in markets and specialty shops during the entire year. Every year there seem to be some sometimes, and I would hazard a guess that there will be more—and more frequently.

Fresh chanterelles can usually be found in the marketplace during every

month except April, May, June, and July. Fresh morels can be tracked down from mid-March through mid-June. From early August through December there is some chance of finding fresh ceps. In the past, most of them have come from the Pacific states, but so much interest is developing that they are beginning to show up from other areas—even Europe.

You are very apt to see more packaged wild mushrooms soon. Even though a specially aerated covering has been developed for them, I will continue to consume only those that I can hand-sort. I trust what I can see and touch, and I don't like risking preservatives. Suppose, for instance, they began to package fresh ceps. My opinion is that it would be inadvisable to buy them: ceps are notoriously prone to insect infestation. We are, after all, speaking of a wild product.

This should by no means be a turn-off! You simply observe the mushrooms closely. Imagine yourself in the market. Lo! You spot some fresh ceps, which look like freshly baked buns and range from the softest, palest coral-brown through all the rusty tones to chestnut and olivaceous browns. The stems are much lighter in color and are stout and brittle. The entire effect should be one of sturdy alertness. The least softness, and the cep may well walk out of the bag before you get it home!

Look for telltale needlelike holes in the top of the cap, and inspect the bottom of the stem for the same. You will find tubes instead of gills under the cap, and they should range in color from pallid white through putty to a pale grayish olive as the mushrooms mature. If the tubes are darker and yellowish olive, don't buy them. The texture will be pithy, and the flavor will be musty.

The pores are a tricky matter because pores, by nature, are holes. Holes can mean that tiny flies have laid their eggs in the mushroom. If you discern a uniformity to the pattern of pore mouths, your ceps are inviolate; if you see irregular groupings of holes, that cep is suspect.

Small ceps are best; the small mushrooms have a smoother texture. How-

ever, the Pacific Northwest ceps are excellent fresh even when larger. Simply go by the color of the pore mouths: remember, the darker the tubes, the less tasty the ceps will be. Still, it is easy to be too fussy.

Do not peel those ceps—unless you get them home and find that the tubes look bashed up and altogether too spongy. Feel free, in that case, to trim them away, but leave the cuticle (the mushroom's outer skin) alone! And be sure to get the ceps into the refrigerator immediately. Keep the mushrooms cap end down in a paper bag. This is another precaution against insects; if there is any



David Arora

moving protein in the stem, it is genetically programmed to move upward. Begin to clean your ceps by cutting off the bottom of the stem. If you find little horrors, keep cutting off horizontal slices until all is pristine. If all still is not, do not despair. Slice the cap in half, and if possible trim away the infested parts. If the entire mushroom is infested—well, even grown men may sometimes weep.

I have been super-conscientious in passing on these tips, but there should really be no problem except possibly in the stem—and that rarely.

Perhaps you will see some large ceps with caps 3 to 6 inches in diameter that

look fine, but the dark color of the pore mouths will tell you that they are too mature. These mushrooms will nonetheless be wonderful if sliced and dried either in the sun—and in California, why not!—or in the oven. Dried sliced ceps are readily available in many markets as are other similar mushrooms of the genus *Boletes*. All of them release fine flavor, but the *edulis* is superior.

Captain Hook sat down on one of the enormous mushrooms (in the Never-Never Land mushrooms grow to a gigantic size).

J. M. Barrie: *Peter Pan*

Did you know that New Zealand is the Never-Never Land of the fungal world? I once saw a newspaper photograph taken in New Zealand of a small child playing under a cep of stupifying proportions. Such tales also emerge from the wilds of the Pacific Northwest. Imagine buns big enough not only to support Captain Hook—but Paul Bunyan as well!

And now for our breakfast of "Omelettes aux Cèpes Duxelles." The omelettes will be sensational, and as a brunch idea they would be great accompanied by fresh asparagus or artichoke hearts with hollandaise. However, we have some cep stems remaining. At our leisure we will chop them finely and sauté them in butter, adding them later as a texture and flavor enhancement to an otherwise standard cream of mushroom soup made with *Agaricus bisporus*, our unjustly despised store mushroom. Add a little nutmeg and brandy to the soup; the chopped cep stems will keep nicely for up to two weeks refrigerated in an airtight container—but only if first sautéed.

Prefer those mushrooms that in pastures spring:

To swallow others is a dangerous thing.

Horace: *Satires*

Let us ignore this persistent philistinism as we make "Marinated Ceps." I

OMELETTES AUX CÈPES DUXELLES

1¼ lbs fresh ceps

¼ cup + 4 T olive oil and melted butter mixed in equal proportions

1 shallot or onion, finely chopped

1 ample T parsley

pinch grated nutmeg

dash cayenne pepper

Omelettes:

12 eggs

salt and pepper

¼ cup olive oil and melted butter mixed in equal proportions

Chop one pound of cep caps and stems very fine; reserve a quarter pound of mushrooms to be sliced and sautéed. We will have cleaned the ceps with but a dampened towel, first brushing away any loose dirt.

Cook the chopped ceps in a heavy skillet over low heat using the quarter cup of the olive oil and butter mixture. Stir occasionally until all the liquid has evaporated. Salt to taste and reserve the *duxelles* in a bowl, stirring into it the parsley, the nutmeg, and the cayenne. You will have two cups of *duxelles*.

Slice the caps of the remaining ceps. Sauté them in four tablespoons of the olive oil and butter mixture in the skillet you just used. Set them aside.

Now for the omelettes themselves. Beat all twelve eggs and season them with salt and pepper. You will be making four omelettes, and how you do it depends on the pan or pans you have. Cook the omelettes in olive oil and butter mixture. Fill each omelette with a fourth of the *duxelles*, fold, and when done spoon cep slices onto each and serve with a little sprinkle of parsley and lemon juice.

MARINATED CEPES

1 pound small cep caps
¾ cup olive oil
¼ cup lemon juice
1½ t grated lemon peel
1 t crushed oregano
1 t garlic salt
⅛ t black pepper
2 T dry white wine

For this recipe, use only the caps of very small ceps. If your ceps are larger, halve or quarter the caps. Reserve the stems and prepare them for use in another dish.

Put the cep caps in a saucepan with the olive oil, lemon juice, lemon peel, oregano, garlic salt, black pepper, and white wine. Bring all to a boil and simmer gently for one minute. Cool and allow to marinate for several hours in the refrigerator. Drain the ceps before serving, and allow time for the oil to melt if it has congealed. This makes about 12 servings. The marinade can be used as salad dressing or to marinate other foods. Marinated ceps will keep for months if refrigerated and covered by olive oil.

PORCINI INSALATA ROMA

1 head romaine lettuce
8 T marinade from "Marinated Ceps"
dry vermouth
lemon juice
salt and pepper
½ of the marinated ceps

Clean the lettuce and break it into bite-size bits. For the dressing, add to the juice from the marinated ceps a dash of dry vermouth, a few drops of fresh lemon juice, and adjust the salt and pepper. Mix half the marinated mushrooms with the lettuce. Pour the well-mixed dressing over the salad and toss lightly. Good! Serves four.

SALADE CÈPES AUX CHÈVRE

1 head romaine lettuce
12 T marinade from "Marinated Ceps"
dry vermouth
lemon juice
4 skinned and quartered medium tomatoes
4 ounces chèvre (goat cheese)

Clean the lettuce and break into bite-size pieces. To the dressing for the "Porcini Insalata Roma" add the extra marinade and the tomatoes. Crumble the chèvre on the romaine, toss lightly, and serve. Serves four.

CEP-STUFFED PORK CHOPS

4 T unsalted butter
4 T olive oil
six 1½ inch thick pork chops

STUFFING:

½ pound small ceps
4 T unsalted butter
4 T olive oil
¾ cup celery
1 minced clove garlic
½ cup onion
1 package (14 ounces) unseasoned bread crumbs
1 egg
4 T Madeira
¼ cup chicken broth
salt and pepper
½ t *bouquet garni*

SAUCE:

1 cup heavy cream
1 cup chicken broth
bouquet garni
salt and pepper
3 T unsalted butter
1 T flour
cep stems
1 T Madeira

Clean the ceps and cut off the stems. Next, slice the caps and chop the stems. Melt together the butter and olive oil; divide the mixture between two small skillets. Divide the celery, garlic, and onion between the two skillets, and put the sliced cep caps in one and the chopped cep stems in the other. Sauté all until golden. Divide a package of unseasoned bread crumbs between the two skillets; stir each well and then toss all together into a bowl.

Beat the egg and Madeira into the chicken broth and stir well into the stuffing; season with salt, pepper, and the *bouquet garni*. Reserve—you will have around one quart of stuffing.

Preheat the oven to 400 degrees. Quickly brown the trimmed pork chops on both sides in a very large skillet; use four tablespoons of an olive oil and melted butter mixture. Sprinkle with salt and pepper, remove, and set aside to cool. Cut a slit in the side of each chop deep enough to make pocket. Fill each pocket with stuffing. Arrange the chops in a shallow baking dish that you have lightly coated with olive oil and butter.

Make six mounds of the leftover dressing in the baking dish. Cover the dish snugly with foil and bake for forty-five minutes; at that point add one tablespoon of Madeira to the baking dish and cook for fifteen minutes more.

While the chops are baking, combine the cream, chicken broth, and a good dash of dried *bouquet garni*, salt, and pepper. Set to simmering gently.

Make a *roux* of the butter and the flour.

Mix with a wire whisk until golden and bubbly. Gradually add one cup of the sauce, whisking briskly. Add to the sauce in the saucepan, stirring all to the boil. Reduce heat and add the reserved cep stems along with one tablespoon of Madeira. Simmer until of desired thickness. Put aside, keeping hot.

When the chops are cooked, put one chop on each hot dinner plate along with one mound of dressing. Cover both with sauce and serve. Serves 6. A Pinot Noir blanc would be great with this or a beautiful ruby California Cabernet Sauvignon if you prefer a red wine. Roasted colorful peppers, onions, and broccoli flowerets go well with this entree.

In stuffing meat with mushrooms, we have created a variation on a classic known as "Cèpes à la Bordelaise." It's an excellent dish to be eaten as is. Take as many ceps as you like, and put halved or quartered caps in one skillet and chopped stems in another. Fry everything in both skillets in two tablespoons each of olive oil and butter with finely minced garlic and onion. Salt and pepper the ceps and toss the contents of the two skillets together with the smallest and crispest croutons you can devise. Sprinkled with lemon juice and minced parsley. Alternately you may lightly fry the ceps and bake them covered with parsleyed bread crumbs. Keep the baking dish covered throughout. Add fried onions and garlic to the topping and, of course, salt and pepper. Bake it for half an hour in a moderate oven.

think that raw ceps are tasty, but it seems that they are not for everyone. Marinated they are—or ought to be! Now let's do a simple salad with those marinated ceps, which we will call "Porcini Insalata Roma." Another salad idea is to use the marinated ceps with goat cheese and tomatoes—"Salade Cèpes aux Chèvre."

I'm afraid those prancing piglets were doomed from the start, for I am now obsessed with the notion of preparing "Cep-Stuffed Pork Chops," so here goes.

Some use only olive oil in these dishes—an Italian leaning—which suggests how very good ceps taste with red wine and tomatoes. Let us stuff cep caps with this concoction, which I call "Porcini Come Pizza." The cep caps rather than dough will be the pizza bases.

There is an old saying among rustics in the country districts in County Durham that a mushroom once looked at will grow no more. Of course the reason is that it is immediately plucked.

H. Askew in *Notes and Queries*
(September 28, 1929)

This is an old saying in other parts of the world as well. Leslie Martin, a food and wine writer of some repute, tells me that in France this is said of *cèpes*. Members of a French family that she knows

from a village in the Piedmont area swear that a *cèpe* once looked at grows no more. These are not *pauvres paysans* but sophisticated individuals who have made the experiment of leaving small *cèpes* in the woods. Upon returning, other ceps had sprung up, but the original ones were still the same size. Some of the new ones were larger! They conducted the experiment for Leslie, and she was astonished to find that the old saying was true.

I once tried it myself with a few morels, carefully concealing them from the eyes of other possible hunters. When I returned, the hidden morels had not grown a jot! Others of various sizes had sprung up, however. I strongly suspect that in some subtle way the mycelium of the untouched mushrooms had been genetically reprogrammed to stop the growth of those fruiting bodies because they had been disturbed through the adjacent picking of other fruiting bodies. So much for elves, brownies, and that lot.

When fresh ceps are unavailable, the dried ones can be found in many markets. Reconstituted in a small bowl, covered tightly and set aside for thirty minutes or so until softened, they are wonderful. Be sure to reconstitute them with boiling water, otherwise the process will take three hours. The ceps will leave a concentrated liquor that when

strained makes an excellent soup base. Dried ceps are superb in quiche and nothing—but *nothing*—beats them in homemade steak sauce. They are gloriously pungent in pâtés, pasta dishes, and are made for veal and chicken. But look out for too much pungency! One ounce will be ample in most dishes serving four to six. Puréed with dry white wine and chicken stock, butter, and cream—pure heaven with chicken breasts. Done with onions in a risotto they are magnificent. I think my favorite use for them is with veal. Let's do "Veal with Ceps in Sour Cream."

I once left a bosky dell near the Sierra National Forest with a basket of wild mushrooms and tarried over coffee in a small village shop with the basket still to hand. A rustic and fearful philistine implored me repeatedly to throw them all away because, said he, "them toadstools gonna kill ya, guy. Ain't no way ya can tell the good ones from the deadly poison ones without a chemical test." I wonder if he is still alive?

William Breen describes himself as a world-weary fashion designer who became a writer-artist with a business in wild edible mushrooms. He is also interested in food and wine as they relate to cooking and eating mushrooms in an inspired manner.

PORCINI COME PIZZA

1 sweet Italian sausage
2 cloves garlic, minced
4 T parsley, minced
 $\frac{2}{3}$ cup mozzarella cheese
12 medium ceps
 $\frac{1}{4}$ cube unsalted butter
4 T olive oil
1 small can tomato paste
 $\frac{3}{4}$ cup dry red wine
oregano

Boil the sausage for twenty minutes. In the meantime, clean the ceps with a dampened towel; remove the stems and hollow out a nice cavity in each cap. This will necessitate removing the tubes. Save them to incorporate into the stuffing.

Chop the stems and tubes. Reserve. Melt the butter in a large skillet and add the olive oil. Baste and bathe each cep cap in this mixture until completely coated. Put half the oil and butter into a baking dish and place the ceps therein with the top of the cap facing down.

Skin the sausage and put the meat in the skillet. Stir it and separate it into small bits as it fries until lightly browned. Add the garlic, parsley, and the cep parts. Sauté all lightly, mixing well. Add a bit more olive oil if needed. Turn off heat. Preheat oven to 375 degrees.

Mix the tomato paste with the wine. Add a pinch of oregano, stirring all well. Add to sausage and mushroom mixture. Turn on heat and simmer and stir until sauce is reduced nearly to the consistency of the original tomato paste. Check salt.

Stuff the caps with the mixture and place each back in the buttered and oiled baking dish. Bake for fifteen minutes. Remove from stove and sprinkle each with the shredded mozzarella and the remaining two tablespoons of parsley. Place three to four inches under the broiler and broil until the cheese is nicely melted. Serves four as a first course. Some stuffing paste may remain, and this is very tasty when thinned with a bit of red wine and used in an omelette.

VEAL WITH CEPES IN SOUR CREAM

1 ounce dried ceps
6 eight-ounce veal cutlets
bacon fat
6 medium tomatoes, skinned and sliced
2 T Dijon mustard
2 T paprika
 $\frac{1}{2}$ cup sour cream

Reconstitute the ceps with hot water, letting them soak for half an hour. Reserve the liquid. Brown the veal cutlets in bacon fat for six minutes on each side in a heavy-bottomed skillet. Put aside and keep warm.

Sauté the cep slices in the remaining bacon fat. Add the tomatoes, the mustard, and the paprika. Return the cutlets

to the pan and add the cep liquid, which you have strained, and bring to a boil. Add some water so that you have enough to barely cover the cutlets. Simmer until the liquid is reduced by half. Remove the cutlets and gently stir the sour cream into the sauce. Simmer a few minutes, replace cutlets, heat through, and serve with broad noodles.



Jean Theodore Delacour

JEAN DELACOUR: THE ORNITHOLOGIST. It could be said that with the passing of Jean Delacour on November 5, 1985, the era in which the world's avifauna was discovered, collected, described, named, and classified came to an end. While only a very few of the people who brought into being our now nearly complete picture of the birds of the world are still living, and while an occasional unknown species of bird may still remain to be discovered, the vast number of ornithologists working today have little or no idea of the tension and excitement that used to characterize the large museums as new lots of specimens were received from the field and their included novelties and rarities revealed to the waiting and always surprised curators. Even such routine jobs as the unpacking of cases and crates and the unwrapping of each specimen took on something of the air of a "grab bag" party. No one knew what he or she might pull out next, and anything that seemed unfamiliar was handed around from person to person for quick inspection. In those days most museum ornithologists were accustomed to dealing with birds of all kinds from all parts of the world, regardless of any prior personal experience, or lack of it, with any particular group of birds or geographic region. All this is now changed: most museum staff members are specialists on certain families of birds or on the birds of one continent or another.

This was the kind of museum atmosphere in which Delacour's awareness of and constantly deepening preoccupation with the great diversity of bird life grew and blossomed so productively over an

unusually long life devoted to its study. His five collecting expeditions to the French colonies of Indochina, Cochin China, Cambodia, and adjacent areas of southeast Asia (collections now mostly housed in the French National Museum in Paris) completely altered the status of ornithological knowledge of that rich portion of the world. Later he also advanced our knowledge of the birds of Madagascar, although he left much of the final writing of the results to others, particularly to the late Austin L. Rand. Delacour's four-volume report on his southeast Asian explorations was his principal contribution to faunal ornithology, but he was also much interested in special groups of birds, especially waterfowl (ducks, geese, and swans), pheasants, pigeons and doves, and, later in his life, curassows and their allies. On each of these large groups he published elaborate monographs with many colored plates, a notable series of volumes of lasting value and usefulness.

Along with his museum-oriented studies Delacour was, from the very beginning, interested in keeping and observing living birds. Early in childhood he became entranced with the story of the Garden of Eden and began to dream of re-creating it. Always realistic in his plans, he knew that in such a garden of peaceful coexistence carnivores would have to be excluded. Birds would, of course, have to be confined in aviaries, although some, such as peacocks and a few cranes, could roam the extensive grounds at large. Visitors to Delacour's estate were delighted to find kangaroos and gazelles sharing the lawns and paths with them. Delacour kept a surprisingly large variety of birds at his chateau, and he observed them closely and sympathetically. This gave him a broad knowledge of the behavioral traits of birds and often enabled him to revise then-current estimates of the degree of relationship between some of them. This unwritten knowledge often caused him to decide that two or more species previously placed in different genera should be united or, conversely, species hitherto considered congeneric really belonged in separate genera. Delacour's skill in arranging and maintaining extensive aviaries quickly brought him to the attention of zookeepers and eventually established him as the dean of the world's students of birds in captive conditions that are as close to nature as

possible.

It is probably correct to say that Delacour eventually settled in southern California because the climate seemed to him ideal for aviculture. In the early 1950s he was offered the directorship of the Los Angeles County Museum, on the acceptance of which post he became firmly attached to the area. At that time the museum's collections in natural history were largely local in their coverage—the southwestern United States and adjacent portions of Mexico—and were overshadowed in scientific importance by the vast assemblage of vertebrate fossils from the tar pits of Rancho La Brea. These paleontological treasures were, indeed, the main research materials the museum had to attract the attention of scientists, and this caused Delacour to concentrate on building up collections in other fields. The Machris Brazilian Expedition, which he led, was the first of the museum's ventures far afield, and the mammals, birds, insects, and other specimens thereby acquired started the worldwide scope of the museum's now extensive and important collections. These expeditions raised the museum's status from that of a provincial to a truly worldwide research center. Delacour himself could hardly have anticipated the rapidity with which the collections would grow in the decades since he retired in 1960, but it was he who started its progressive expansion. As late as the early 1960s, he wrote in a letter that it was impossible to do systematic research on birds in Los Angeles because the collections and libraries here were too incomplete and inadequate. That has changed, and he lived to see the fruits his early seeds caused to develop.

If one were to attempt to describe Jean Delacour's interest in the world of nature, one would say that he deeply enjoyed natural history, plants as well as animals, and that his enjoyment was intellectual, not merely emotional. He thought much about nature's various aspects, even if he never personally undertook any interpretive research of a philosophical or analytical type. He was satisfied to describe and compare and was content to leave experimental studies to others. In the course of his long life he traveled everywhere, saw and remembered in accurate detail incredible numbers of animal and plant species, and carried with him to the end

of his life an abiding love of the world and its inhabitants.

—Herbert Friedmann

Director Emeritus, Natural History
Museum of Los Angeles County

The Museum Foundation has established a Jean Delacour Memorial Fund to receive donations in honor of our past director. Funds will be used to install an exhibit in his name in our new Bird Hall public display. Contributions should be made out to the Natural History Museum's Delacour Fund and sent to Dr. Ralph Schreiber, Natural History Museum, 900 Exposition Boulevard, Los Angeles, CA 90007.

JEAN DELACOUR (1890–1985): IN MEMORIAM. Jean Delacour was best known to Natural History Museum members and the Los Angeles community as director of the Los Angeles County Museum from 1952 to 1960. To the international scientific community he was, and had been for most of his long life, an eminent ornithologist and indisputably the world's leading aviculturist.

His ornithological interests were exceptionally broad and spanned the fields of systematics, behavior, evolutionary biology, biogeography, and conservation; he made significant contributions to all of these fields. To the host of his colleagues and friends he was a true man of the world—well educated and scientifically trained at an early age, widely traveled, highly knowledgeable not only in ornithology and botany but also in fine arts, history, and virtually all fields of intellectual and cultural interest. Fortunate to have been born into wealthy circumstances, he nevertheless eschewed the easy role of a dilettante, and two world wars brought tragedy and sacrifice to his life. The richness of his interests and experiences contributed to his well-deserved fame as a witty raconteur, a connoisseur in many areas, and also one who was strongly and unabashedly candid in his opinions of both persons and ideas.

Jean Delacour was born on September 26, 1890, in Paris, France. He grew up on a splendid estate at Villers-Bretonneux, in Picardy. His parents encouraged his interest in plants and birds, and at an early age he kept aviaries and exotic gardens. His education in Paris was demanding, but he graduated with honors.

By World War I he had developed what was probably the world's finest private aviary at Villers. Unfortunately, it was totally destroyed during the last year of the war. Deeply affected by this disaster, he nevertheless started over at Clères in Normandy, near Rouen. Here, in a beautiful setting of great historical significance, in a chateau that had housed Joan of Arc (imprisoned) and Charles IX and Catherine de Medici (plotting political strategy), Delacour re-established the world's finest private aviary, which was to last until World War II. In the meantime, he had earned a doctorate in botany at the University of Lille and entered a period of extraordinary productivity in field research, writing and publication, and organizational activity. Among many other accomplishments, he founded the journal *L'Oiseau* in 1920 and edited it until 1940. He participated in a seven-year study of the birds of what was then French Indochina that involved many months of field collecting of specimens from that ornithologically little-explored part of the world. *Les Oiseaux de l'Indochine Française*, the four-volume work that he co-authored with Pierre Jabouille, is still the standard reference on that region. Other field research took him to Venezuela, the Caribbean region, and Madagascar. He had become a leading international figure in ornithology and aviculture and a prolific writer on these subjects, and he had also become active in bird conservation.

Then, for a second time, a world war struck and brought destruction and tragedy. Jean had to flee his homeland and his beloved aviaries at Clères, but only after sending many of his most valuable birds to other and safer facilities. He arrived in New York in late 1940 and was welcomed to the staffs of the Bronx Zoo and the American Museum of Natural History, where he was reunited with other European expatriates and American colleagues. He immediately resumed a vigorous research and publication program and traveled across the United States to acquaint himself better with American aviculture. This inevitably brought him to southern California, where the climate impressed him most favorably. After the end of World War II he returned to Clères, re-established his aviary there, and restored it to much of its former glory, but he still retained a great affection for California.

In 1952 Los Angeles needed a new di-



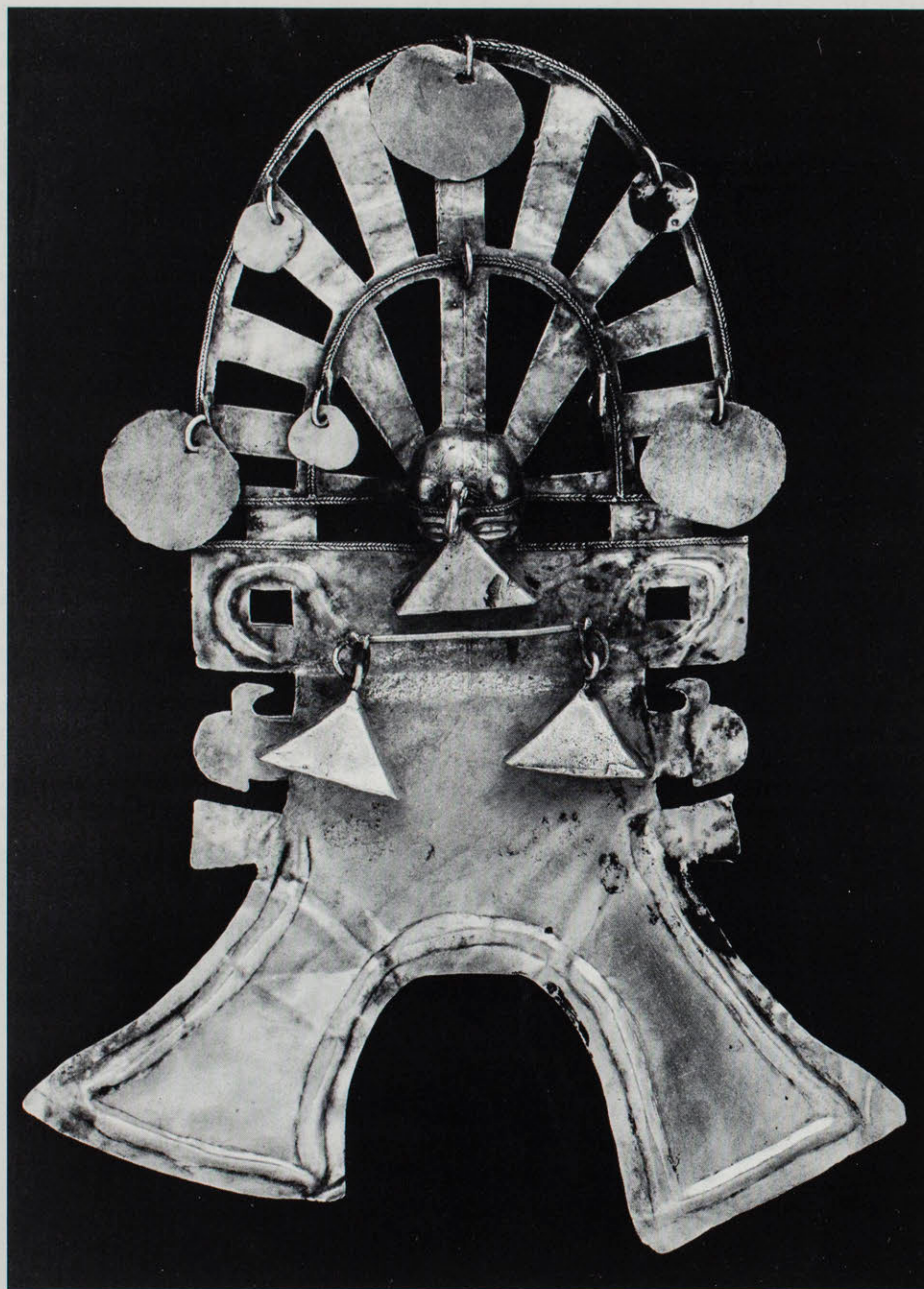
A white peacock contemplates the Chateau de Clères, the late Jean Delacour's French home. Photograph by R. W. and E. A. Schreiber.

rector for what was then a single Los Angeles County Museum of History, Science, and Art. Jean Delacour was one of the few individuals that had sufficient expertise in all three of these fields, and he was appointed director. He became an enthusiastic resident of Los Angeles, purchasing a home in the Wilshire District that had a stream running through the grounds, which provided rare local conditions for an aviary. He soon assembled a superb collection of birds ranging from flamingos to tiny jewellike nectar-feeders from the South American tropics. Still fully active in world ornithology and also in conservation (he was a founder and first president of the International Council for Bird Preservation), he divided his time between Los Angeles, New York, France, and the world. He brought, for the first time, a truly international perspective to the bird collections and many other aspects of the Los Angeles County Museum. The Maurice Machris Brazilian Expedition, which he helped to organize and in which he participated, was a major achievement of this period. The museum's Jean Delacour Auditorium, opened in 1960, has made his name familiar to millions of visitors and radio listeners who have enjoyed the various scientific, cultural, and musical programs presented there. After his retirement, he sold his home but retained his membership in the California Club, where he stayed during his long residences in Los Angeles during the winter. He never slackened in his writing and conservation activities, and he received the continuing admiration and affection of the entire ornithological world.

His honors were legion, ornithological and otherwise, including of course the Legion d'Honneur of France. Among the more recent awards and celebrations were the Arthur A. Allen Award of Cornell University, given to him in October 1977 for distinguished service to ornithology. In February 1983, the Jean Delacour/International Foundation for Conservation of Birds Symposium, organized by aviculturist Gerald Schulman, brought together in Los Angeles leading authorities from around the world. A celebration dinner honoring Delacour was given at the centennial meeting of the American Ornithologists' Union in New York in September 1983, which virtually coincided with his ninety-third birthday.

His advanced years brought increasing physical problems, but his mind remained clear, his memory sharp, and his

Gold pectoral from the Chibcha culture, Bogota Valley, Colombia, circa A.D. 1000 to 1500. Photograph by Armando Solis.



wit and intellectual perception undiminished. He finally left Clères permanently in 1985 as he could no longer tolerate the winter conditions in a not-fully-modern residence, and he then settled in the California Club. He was still vigorous in the summer of 1985 despite problems with arthritis, and he was honored at a large birthday gathering of his friends in September, hosted by Museum Board of Governors President Ed N. Harrison. Delacour's health failed rapidly soon

after, and he died on November 5, 1985. Few individuals in any era have had such opportunities during such a long lifetime, or have made so much of them, as Jean Delacour.

—Thomas R. Howell
Professor of Zoology, UCLA

ETHNIC ARTS COUNCIL FUNDS GOLD EXHIBIT IN PRE-COLUMBIAN HALL. The Ethnic Arts Council of Los Angeles has provided funding in partial

support of the installation of an exhibit of ancient Latin American goldwork in the Natural History Museum's Pre-Columbian Hall. The display, which will replace the present West Mexican tomb replica, is one of several changes planned for the renovation of the hall.

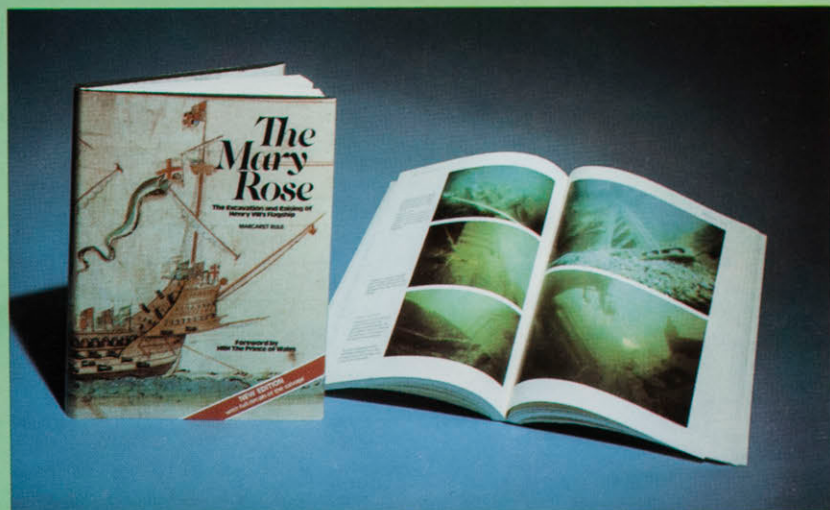
The \$5,000 grant to the Anthropology Section will make possible the extra security needed to ensure the safety of the artifacts. These measures will allow more items to be shown from the museum's holdings of over a hundred examples of gold pre-Columbian artwork.

SECTION OF BIRDS AND MAMMALS RECEIVES NATIONAL SCIENCE FOUNDATION GRANTS. The Section of Birds and Mammals recently received two grants from the National Science Foundation to fund renovation of the section's facilities and recuration of the mammal collection. Dr. Ralph W. Schreiber was awarded \$143,987 to purchase cases and compactors for the bird collection; Dr. Sarah B. George was awarded \$214,523 to cover cases and compactors for the mammal collection plus salaries for two technicians for the recuration portion of the work. The installation of the compactors for both collections is expected to be completed within eighteen months. Funding for the work in the mammal collection will last for three years.

GRANT TO STUDY CAREER OF U.S./ AUSTRALIAN MINER AWARDED. Donald Chaput, Curator of Military and Political History, has received a grant from the Australasian Mineral Heritage Trust to study the career of Julius Kruttschnitt, first manager of the Mount Isa Mines, Queensland, Australia, one of the largest corporations in Australia and one of the largest metal producers in the world.

Kruttschnitt was raised in San Francisco, where his father was head of Southern Pacific Railroad. Kruttschnitt graduated from Yale in 1908 and worked in the Southwest and Mexico as regional manager of the American Smelting and Refining Company. In 1930 he moved to Queensland to head the floundering firm of Mount Isa Mines. By World War II it had become Australia's top metal-producer, largely due to his efforts, and it has continued to flourish to this day. Kruttschnitt died in Queensland in 1974.

Mr. Chaput will be researching Kruttschnitt's career and will publish, with Professor Kett Kennedy of James Cook University, Queensland, a book-length study in 1988.



Book by *Mary Rose* Project Director

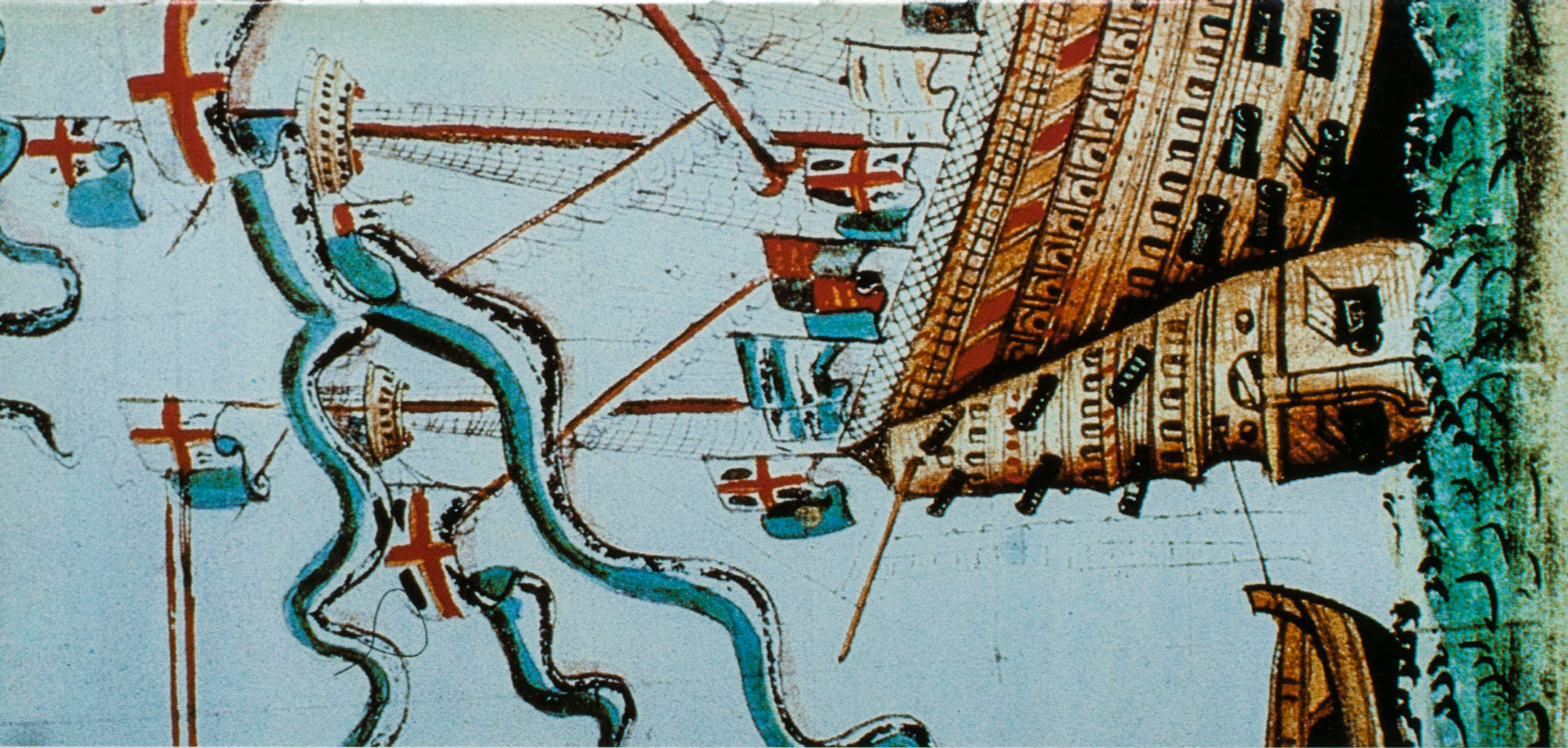
The *Mary Rose* may be the most important archaeological ship find of all time. When the pride of Henry VIII's fleet suddenly sank in 1545, trapped within her were more than 700 men and their effects. Many of these priceless relics of everyday Tudor life will be on display at the Natural History Museum from July 19 through October 15, 1986.

Dr. Margaret Rule, the Archaeological Director of the Mary Rose Trust, has chronicled her seventeen years' work with divers and marine archaeologists, including the Prince of Wales, to raise the hull of the *Mary Rose* and save the artifacts found within. Her book, *The Mary Rose: The Excavation and Raising of Henry VIII's Flagship*, places the archaeological finds in historical perspective and makes Tudor life come alive.

To order your copy of Dr. Rule's book before visiting the exhibit, use the handy mail order blank below. The Museum Bookstore will also be offering paper models of the *Mary Rose*, cards, T-shirts, slides, paperweights, and reproductions of tankards and spoons found aboard the lost ship.

Quantity	Price each book	Amount	Name _____
_____	22.95 hard	_____	Address _____
_____	16.95 soft	_____	City/State _____
_____	Subtotal	_____	Zip Code _____
(Museum Members only) — 10% disc.	_____	_____	Telephone (_____) _____
_____	Subtotal	_____	(Daytime)
(Calif. residents add 6 1/2% sales tax)	_____	_____	☐ Check or money order
+ Sales tax	_____	_____	☐ VISA ☐ MasterCard ☐ American Express
Postage & handling + 2.50	_____	_____	Account # _____
Grand total	_____	_____	Expiration date _____
			Signature _____
			(as on card)

Mail to: **MUSEUM BOOKSTORE** Natural History Museum
900 Exposition Blvd., Los Angeles, CA 90007
213/744-3434



Natural History Museum of Los Angeles County
Exposition Park, Los Angeles, California 90007

